

V. DISCONTINUED COMMERCIAL – INDUSTRIAL PROGRAMS

BPA COMMERCIAL TANK WRAP PROGRAM

Description

This program was funded by BPA to wrap hot water tanks in commercial buildings. It operated only in 1982 and 1983.

Eligible Population

This program was limited to 1,000 commercial hot water tanks, a small percentage of City Light's commercial customers.

Lifetime of Conservation Measures Installed: 12 years

Electricity Savings

The average customer that participated in the BPA Commercial Tank Wrap Program saves about 500 kilowatt-hours (kWh) per year.

Between 1982 and 1994, the BPA Commercial Tank Wrap Program saved 5,988 megawatt-hours (MWh). However, since the lifetime of these measures has expired, this program did not deliver any savings in 2002.

BPA COMMERCIAL TANK WRAP PROGRAM**ELECTRICITY SAVINGS FOR THE BPA COMMERCIAL TANK WRAP PROGRAM**

Year	Participants by Year	Cumulative Participants	kWh Savings per Participant	MWh Savings in Year (1)	Avg. MW Load Reduction in Year
1982	424	424	500	212	0.024
1983	573	997	500	499	0.057
1984	0	997	500	499	0.057
1985	0	997	500	499	0.057
1986	0	997	500	499	0.057
1987	0	997	500	499	0.057
1988	0	997	500	499	0.057
1989	0	997	500	499	0.057
1990	0	997	500	499	0.057
1991	0	997	500	499	0.057
1992	0	997	500	499	0.057
1993	0	997	500	499	0.057
1994	0	997	500	287	0.033
1995-2002	0	997	500	0	0.000
Electricity Savings Since Start of Program:				5,988	MWh

Program Expenditures

The program expenditures during 1982 and 1983 totaled \$65,344. This program was totally funded by the BPA.

**PROGRAM EXPENDITURES AND BPA FUNDING
FOR THE BPA COMMERCIAL TANK WRAP PROGRAM**

Year	Expenditures/ Funding (2)
1982	\$16,336
1983	49,008
1984-2002	0
TOTAL	\$65,344

BPA COMMERCIAL TANK WRAP PROGRAM

Notes

1. Electricity savings figures are from the *Evaluation of the Commercial Efficiency Standards* (1985). After 1983 the program was discontinued, so the later savings shown represent continuing savings from earlier program participants. First year energy savings from new participants completing work in each year were: 212 MWh (1982); and 287 MWh (1983).
2. The 1982 and 1983 expenditures are from the BPA Short-Term Contract Final Report. All program operating costs were covered by BPA.

COMMERCIAL INCENTIVES PILOT PROGRAM

Description

Under the sponsorship of the Bonneville Power Administration (BPA), Seattle City Light operated a pilot program from July 1986 through September 1990, in which financial incentives were offered to commercial customers for installing energy conservation measures in buildings. Funding for the Commercial Incentives Pilot Program (*CIPP*) ended on September 30, 1990, and all contracts with customers were executed by this date. Installation of the energy conservation measures in some of the buildings continued into 1991.

The financial incentives for customers were offered through two program components, rebate and incentive. In the rebate part of the *CIPP* program, the incentives were offered to small commercial customers with annual electricity consumption from 6,000 to 150,000 kilowatt-hours. City Light paid the customers a rebate for a portion of the installed cost on a limited set of conservation measures.

For medium and large customers whose annual electricity consumption was more than 150,000 kilowatt-hours, City Light paid the customers an incentive for all cost-effective conservation measures that were identified in an energy audit. The amount of the incentive payments to the customers depended on the estimated electrical energy savings for the buildings.

Conservation services in the *CIPP* were provided through City Light and energy service companies (ESCOs). Customers received an energy audit of their building, an analysis of the building's energy use and potential energy savings, recommended conservation measures for realizing these energy savings, training in operation and maintenance procedures, and performance specifications for the measures. The customer (or the ESCo) was responsible for arranging with contractors to install conservation measures in the building and for any financing. City Light and the BPA inspected the building for proper installation of the measures. The BPA reimbursed City Light for the payment that was made to the customer.

Eligible Population

This program served Seattle City Light's 29,520 commercial and 1,995 governmental customers. (1)

COMMERCIAL INCENTIVES PILOT PROGRAM

Lifetime of Conservation Measures Installed

Varies, with an estimated average lifetime of 13 years for rebate buildings and 16 years for incentive buildings. (2)

Electricity Savings

The first year savings per rebate building are 2,500 megawatt-hours (MWh) for 1987 participants, 5,800 MWh for 1988 participants, and 5,300 MWh for 1989 participants. The first year savings per incentive building were 66,400 MWh for 1987 participants, 278,400 MWh for 1988 participants, and 74,200 MWh for 1989 participants. The first year savings for 1990 and 1991 participants are based on a weighted average of the first year savings per square foot for 1987, 1988, and 1989 participants. The calculations were done separately for rebate and incentive participants.

Savings for 1987, 1988, and 1989 participants though the 1992 calendar year were taken from the 1994 evaluation of the *CIPP* program. The 1992 savings for these groups were carried forward for years beyond 1992. For 1990 and 1991 participants, first year savings were carried forward for subsequent years.

Since 1986, *CIPP* has saved a total of 296,708 megawatt-hours (MWh). Energy savings in 2002 from cumulative (1987-1991) participants were 21,547 MWh. The load reduction in 2002 due to this program was 2.460 average megawatts (aMW).

COMMERCIAL INCENTIVES PILOT PROGRAM

ELECTRICITY SAVINGS FOR THE COMMERCIAL INCENTIVES PILOT PROGRAM

Year	Partici- pants by Year	Cumulative Participants (3)	kWh Savings per Participant (4)	MWh Savings in Year (5)	Avg. MW Load Reduction in Year
Rebate Customers:					
1987	20	20	2,500	50	0.006
1988	17	37	5,765	168	0.019
1989	19	56	5,253	123	0.014
1990	44	100	3,122	459	0.052
1991	3	103	20,407	575	0.066
1992	0	103	20,407	575	0.066
1993	0	103	20,407	575	0.066
1994	0	103	20,407	575	0.066
1995	0	103	20,407	575	0.066
1996	0	103	20,407	575	0.066
1997	0	103	20,407	575	0.066
1998	0	103	20,407	575	0.066
1999	0	103	20,407	575	0.066
2000	0	103	20,407	525	0.060
2001	0	103	20,407	407	0.046
2002	0	103	20,407	451	0.052
Incentive Customers:					
1987	18	18	66,411	1,195	0.136
1988	28	46	278,364	8,946	1.021
1989	37	83	74,165	10,628	1.213
1990	28	111	193,314	15,440	1.763
1991	20	131	415,000	21,096	2.408
1992	0	131	415,000	21,096	2.408
1993	0	131	415,000	21,096	2.408
1994	0	131	415,000	21,096	2.408
1995	0	131	415,000	21,096	2.408
1996	0	131	415,000	21,096	2.408
1997	0	131	415,000	21,096	2.408
1998	0	131	415,000	21,096	2.408
1999	0	131	415,000	21,096	2.408
2000	0	131	415,000	21,096	2.408
2001	0	131	415,000	21,096	2.408
2002	0	131	415,000	21,096	2.408

(Cont'd.)

COMMERCIAL INCENTIVES PILOT PROGRAM**ELECTRICITY SAVINGS FOR THE COMMERCIAL INCENTIVES PILOT PROGRAM**

(Continued)

Year	Partici- pants by Year	Cumulative Participants (3)	kWh Savings per Participant (4)	MWh Savings in Year (5)	Avg. MW Load Reduction in Year
Total Program:					
1987	38	38	—	1,245	0.142
1988	45	83	—	9,114	1.040
1989	56	139	—	10,751	1.227
1990	72	211	—	15,899	1.815
1991	23	234	—	21,670	2.474
1992	0	234	—	21,670	2.474
1993	0	234	—	21,670	2.474
1994	0	234	—	21,670	2.474
1995	0	234	—	21,670	2.474
1996	0	234	—	21,670	2.474
1997	0	234	—	21,670	2.474
1998	0	234	—	21,670	2.474
1999	0	234	—	21,670	2.474
2000	0	234	—	21,620	2.468
2001	0	234	—	21,502	2.455
2002	0	234	—	21,547	2.460
Electricity Savings Since Start of Program:				296,708	MWh

COMMERCIAL INCENTIVES PILOT PROGRAM

Program Expenditures

Program expenditures from 1986 through 1991 for administration and incentives to commercial customers were \$6,949,122. This represents the cost to the utility, and not the total resource cost. The Bonneville Power Administration provided \$6,136,750 in funding during these years.

PROGRAM EXPENDITURES FOR THE COMMERCIAL INCENTIVES PILOT PROGRAM

Year	Administration (6)	Incentives (7)	Total Expenditures
1986	\$155,743	\$0	\$155,743
1987	368,079	310,126	678,205
1988	419,717	1,147,872	1,567,589
1989	497,918	972,105	1,470,023
1990	519,463	1,564,283	2,083,746
1991	55,077	938,739	993,816
1992-2002	0	0	0
Total	\$2,015,997	\$4,933,125	\$6,949,122

BPA FUNDING FOR THE COMMERCIAL INCENTIVES PILOT PROGRAM (8)

Year	Administration	Incentives	Total Funding
1986	\$32,386	\$0	\$32,386
1987	161,000	113,381	274,381
1988	163,460	1,369,330	1,532,790
1989	278,507	1,219,824	1,498,331
1990	130,037	1,484,916	1,614,953
1991	83,172	1,100,737	1,183,909
1992-2002	0	0	0
Total	\$848,562	\$5,288,188	\$6,136,750

COMMERCIAL INCENTIVES PILOT PROGRAM

Notes

1. The eligible population figures are from the *Seattle City Light Fingertip Facts* (December 1993).
2. There is considerable variability in the lifetime of the conservation measures installed by CIPP participants (*Conservation Measures Life Study for Resource Planning*, BPA, 1987). The conservation measure lifetimes used in this report are from the Evaluation Unit's recent cost effectiveness analysis of the CIPP program (1994).
3. Energy savings information for 1987, 1988, and 1989 participants was derived from the latest evaluation of the CIPP program, *Persistence of Energy Savings in the Commercial Incentives Pilot Program* (1994). Earlier CIPP evaluations are listed in the bibliography of this report.
4. Energy savings for 1990 and 1991 CIPP participants were calculated by taking a weighted average of the first year savings per square foot from the 1994 evaluation (*Persistence of Energy Savings in the Commercial Incentives Pilot Program*), and then multiplying this weighted average by the average square footage in the buildings of 1990 and 1991 participants. The calculation was done separately for rebate and incentive participants. The following table shows the average square footage by year and participant group for the CIPP program.

<u>Year</u>	<u>Rebate</u>	<u>Incentive</u>
1987	3,680	36,843
1988	8,556	99,570
1989	13,000	44,398
1990	5,723	81,320
1991	37,413	174,575

5. The total MWh energy savings by year reflect savings for the current year participants plus savings in that year from prior participants. Savings for commercial buildings were found to vary from year to year for prior participants, as shown below in the kWh savings per building for Rebate and Incentive participants. In this table, the savings estimate for the last post-program year evaluated is carried forward by cohort in future years. Additional documentation on the energy savings for these buildings can be found in *Persistence of Energy Savings in the Commercial Incentives Pilot Program* (1994).

REBATE							
<u>Year</u>	<u>First Year</u>	<u>Second Year</u>	<u>Third Year</u>	<u>Fourth Year</u>	<u>Fifth Year</u>	<u>Sixth Year</u>	<u>Seventh Year</u>
1987	2,500	3,500	2,400	9,400	11,200	11,200	11,200
1988	5,765	(1,441)	(7,124)	(5,329)	(5,329)	(5,329)	
1989	5,253	13,389	12,779	12,779	12,779		
1990	3,122	3,122	3,122	3,122			
1991	20,407	20,407	20,407				
INCENTIVE							
1987	66,411	63,967	61,322	63,189	61,322	61,322	61,322
1988	278,364	242,143	274,314	219,618	219,618	219,618	
1989	74,165	32,678	3,503	3,503	3,503		
1990	193,314	193,314	193,314	193,314			
1991	415,000	415,000	415,000				

First year energy savings from program participants completing work in each year were: 1,245 MWh (1987); 7,868 MWh (1988); 1,638 MWh (1989); 5,148 MWh (1990); and 5,772 MWh (1991).

COMMERCIAL INCENTIVES PILOT PROGRAM

6. Administrative costs for 1986 and 1988 through 1990 were obtained from City Light MIS reports for Work Order No. 70596. These costs include: salaries and wages (budget items 9, 11, and 12); materials, supplies, and printing (21 and 22); paid media space (35); contracted engineering and architectural services (37); data processing (48); and travel (60 and 61). Budget item 66 (incentive costs) was not included in the administrative costs.

For 1987, the administrative costs in the MIS report were reduced by \$80,539 to reflect the fact that, according to program operators, most of the 1987 audit costs for the Energy Management Survey Program were reported under the *CIPP* work order number. For 1991, the administrative costs were taken from Work Order No. 70596 in the Seattle Financial Management System year-end "Work Order Detail Report" (URW210L).

7. Information on payments made to rebate and incentive customers by the *CIPP* program were obtained from financial records maintained by the Commercial–Industrial Section, Energy Management Services Division. These payments are a portion of the total installation costs for the conservation measures. For example, in 1987 the incentive payments to customers were \$310,126, whereas the installation costs for the measures were \$452,481.
8. Information on BPA reimbursements to Seattle City Light for administration and financial incentives to customers was obtained from Commercial–Industrial Section records of invoiced amounts submitted to BPA.

ENERGY CODE MAJOR PROJECTS REQUIREMENTS

Description

The Seattle Energy Code (*SEC*) was amended in December 1983 to include special requirements for major construction projects having over 50,000 square feet. However, the *SEC* provision, requiring a 10% reduction below code was discontinued in July 1991. Previously, to comply with the Major Projects Requirement (*MPR*), designers were required to conduct an energy consumption analysis during the building permit process. Using computer simulations, these analyses demonstrated that the projected energy consumption for the proposed buildings were at least 10% less than the consumption for standard code buildings. This additional efficiency could be achieved through building envelope design and/or the design and selection of the building's mechanical, electrical, water heating, and lighting systems.

Eligible Population

This program applied to new commercial construction from 1986 through 1991 that exceeded 50,000 square feet.

Lifetime of Conservation Measures Installed

Varies, but not less than 16 years. ⁽¹⁾

Electricity Savings

Office buildings covered by this requirement were estimated to have acquired no energy savings, based on an evaluation conducted midway through the program. Thus, the only savings for the Major Projects Requirement came from the 23 non-office buildings.

Since 1986 the Energy Code *MPR* has saved a total of 123,544 megawatt-hours (MWh). Energy savings in 2002 from cumulative (1986-1991) participants were 6,304 MWh. The load reduction in 2002 due to this program was 0.720 average megawatts (aMW).

ENERGY CODE MAJOR PROJECTS REQUIREMENTS**ENERGY SAVINGS FOR THE MAJOR PROJECT REQUIREMENT
From Office and Non-Office Buildings**

Year	Partici- pants by Year (2)	Cumulative Participants	Cumulative Sq. Ft. per Year (3)	MWh Savings in Year (3)	Avg. MW Load Reduction in Year
Office Buildings:					
1986	1	1	108,000	0	0.000
1987	7	8	2,411,000	0	0.000
1988	5	13	4,543,000	0	0.000
1989	5	18	7,607,000	0	0.000
1990	3	21	8,267,000	0	0.000
1991	2	23	9,086,000	0	0.000
1992-2002	0	23	9,086,000	0	0.000
Non-Office Buildings:					
1986	5	5	1,431,000	2,648	0.302
1987	0	5	1,431,000	2,648	0.302
1988	3	8	1,650,000	3,435	0.388
1989	3	11	2,122,000	4,136	0.472
1990	6	17	2,967,000	5,901	0.674
1991	6	23	4,521,000	8,952	1.022
1992	0	23	4,521,000	8,952	1.022
1993	0	23	4,521,000	8,952	1.022
1994	0	23	4,521,000	8,952	1.022
1995	0	23	4,521,000	8,952	1.022
1996	0	23	4,521,000	8,952	1.022
1997	0	23	4,521,000	8,952	1.022
1998	0	23	4,521,000	8,952	1.022
1999	0	23	4,521,000	8,952	1.022
2000	0	23	4,521,000	8,952	1.022
2001	0	23	4,521,000	8,952	1.022
2002	0	23	4,521,000	6,304	0.720
Electricity Savings Since Start of Program:				123,544	MWh

Program Expenditures

The program expenditures from 1984 through 1991 totaled \$1,018,205. Expenditures of \$9,891 in 1991 (the last program year) represent a continued decline of City Light spending on this program that began in 1989. This represents the cost to the utility, not the total cost of the resource. The Bonneville Power Administration (BPA) supplied no funding for this program after 1989.

ENERGY CODE MAJOR PROJECTS REQUIREMENTS**PROGRAM EXPENDITURES FOR THE MAJOR PROJECTS REQUIREMENT**

Year	Expenditures (4)
1984	\$38,875
1985	36,021
1986	221,062
1987	197,925
1988	275,607
1989	176,814
1990	62,010
1991	9,891
1992-2002	0
Total	\$1,018,205

BPA FUNDING FOR ADMINISTRATIVE COSTS OF THE MAJOR PROJECTS REQUIREMENT (5)

Year	Funding
1986	\$54,653
1987	196,820
1988	134,047
1989	65,863
1990-2002	0
Total	\$451,383

Notes

- The lifetime of the conservation measures is dependent upon the specific measures or strategies incorporated in the constructed and occupied building. For many of the building systems the durability of the conservation resource is dependent upon the lifespan of the building, on remodeling and renovation cycles, and on the frequency of conversion of building use. It is likely that measure lives are maximized in new buildings, as opposed to retrofit measures which may be altered or abandoned in the next renovation/remodel cycle (*Commercial Measure Life Study*, BPA, 1987). Further, the service life of commercial conservation measures is critically dependent upon operational and maintenance practices.

Equipment lifetimes have been estimated for commercial buildings in several studies (e.g., *ASHRAE Journal*, Volume 20:10, October 1978; and *Commercial Measure Life Study*, BPA, 1987). Typically, lighting system measures have a hardware life (and accompanying duration of savings) of 15 to 30 years, where 30 years is considered to be the length of remodeling/renovation cycles. Examples: Electronic ballasts have an operational life of approximately 18 years, while parabolic fixtures have a life of 30 years. HVAC measures have a lifespan ranging from 11 years (economizers) to 50 years (heat pumps, with

ENERGY CODE MAJOR PROJECTS REQUIREMENTS

replacement of worn-out parts). Building envelope measures (e.g., glazing, insulation) can be assumed to have a lifetime of 23 to 50 years--dependent upon material breakdown, leakage, etc.

2. Participants (buildings) are counted as of two years after the date of the final Energy Analysis approval (from "Status of Project Subject to Major Projects Requirement," S. Rekhi, Seattle City Light, 1988). This two-year lag allows for the actual construction and occupancy of these buildings. Thus, the participants and their savings shown for 1986 through 1988 are buildings that received Energy Analysis approvals in 1984 through 1986, respectively.
3. Annual savings for office buildings are reported as zero because the evaluation done by Momentum Engineering, Ecotope, and Seattle City Light (*Evaluation of Performance-Based Energy Codes for Large Office Buildings*) reported zero savings. Annual savings for non-office buildings are calculated on a per square foot basis, and thus vary by year (i.e., are weighted) according to the average conditional square footage of MPR buildings for that year. According to data received from Department of Construction and Land Use (DCLU), the cumulative square feet per year are reported in the tables.

Electricity savings for non-office buildings are calculated as 10% of the typical energy-use index (EUI) for electrical energy only (no gas or purchased steam is included in the EUI estimate). The typical EUI is estimated from audit data gathered for the MPR Phase II evaluation (*Major Projects Rule Phase II Evaluation: First Year Report*, prepared for City Light by Momentum Engineering and Ecotope, Inc., 1988). Preliminary results of the MPR Phase II evaluation suggest variability in EUI's for non-office MPR buildings of about 1.0 to 6.0 kWh/square foot/year including electrical energy only, depending on intensity of electrical use. When the 10% savings requirements is multiplied by the EUI for each building, we get the kWh/sq. ft. for that building. For the non-office buildings, the savings vary by the intensity of use.

This method of calculating savings has at least two important shortcomings: First, the method infers that 10% of the typical EUI constitutes savings directly attributable to the MPR, thereby assuming that the buildings would have consumed about 10% more electricity had they not complied with the MPR. Second, there is a significant, but uncalculated, occupancy effect. That is, the EUI's and energy savings vary in different ways across these buildings, depending upon building occupancy and upon the HVAC system capability to "shut down" vacant portions of the conditioned space.

First year energy savings from new participants completing work in each year were: 2,648 MWh (1986); 0 MWh (1987); 787 MWh (1988); 701 MWh (1989); 1,765 MWh (1990); and 3,051 MWh (1991).

4. The source of program administration and implementation expenditures for 1986 through 1990 is City Light MIS reports (Work Order No. 70569). For 1984 and 1985 the MIS Work Order No. was 70569-07. The large increase in expenditures from 1985 to 1986 is due to major Projects Requirement work performed by the Department of Construction and Land use. Expenditures declined further with the discontinuation in July 1991 of the code requirements. For 1991, program expenditures were taken from Work Order No. 70569 in the Seattle Financial Management System year-end report.
5. These data are based on City Light's invoices submitted to and paid by BPA under the BPA Early Adopter Program as reported in City Light MIS reports for Work Order No. 70569). The figure for 1986 is a prorated estimated for that year based on a reimbursement invoice for the period October 1986 through September 1987.

ENERGY MANAGEMENT PARTNERSHIP PROGRAM

Description

This program provided ongoing energy conservation advice for a six- to 12-month period to commercial and industrial customers. Assistance included developing the customer's energy consumption index; conducting an energy audit; and recommending tuning, operation, maintenance and retrofit actions for reducing energy usage. On January 1, 1984, the program was incorporated into the Energy Management Survey Program.

Eligible Population

This program served City Light's commercial and industrial customers.

Lifetime of Conservation Measures Installed

Varies, with an estimated average lifetime of 16 years for measures installed by customers on their own. ⁽¹⁾

Electricity Savings

The average savings were 122,110 kilowatt-hours (two percent, 2%, of the pre-program consumption) for 17 commercial program participants and 621,280 kilowatt-hours (12% of the pre-program consumption) for the one industrial customer in the evaluation.

Between 1980 and 1998, the Energy Management Partnership Program saved a total of 110,447 megawatt-hours (MWh). However, since the lifetime of these measures has expired, this program did not deliver any savings in 2002.

ENERGY MANAGEMENT PARTNERSHIP PROGRAM**ELECTRICITY SAVINGS FOR THE ENERGY MANAGEMENT PARTNERSHIP PROGRAM**

Year	Participants by Year	Cumulative Participants	kWh Savings per Participant (2)	MWh Savings in Year	Avg. MW Load Reduction in Year
Commercial Customers:					
1980	6	6	122,110	733	0.084
1981	2	8	122,110	977	0.112
1982	10	18	122,110	2,198	0.251
1983	8	26	122,110	3,175	0.362
1984	0	26	122,110	3,175	0.362
1985	0	26	122,110	3,175	0.362
1986	0	26	122,110	3,175	0.362
1987	0	26	122,110	3,175	0.362
1988	0	26	122,110	3,175	0.362
1989	0	26	122,110	3,175	0.362
1990	0	26	122,110	3,175	0.362
1991	0	26	122,110	3,175	0.362
1992	0	26	122,110	3,175	0.362
1993	0	26	122,110	3,175	0.362
1994	0	26	122,110	3,175	0.362
1995	0	26	122,110	3,175	0.362
1996	0	26	122,110	2,442	0.279
1997	0	26	122,110	2,198	0.251
1998	0	26	122,110	977	0.112
1999-2002	0	26	122,110	0	0.000
Industrial Customers:					
1980	1	1	621,280	621	0.071
1981	1	2	621,280	1,243	0.142
1982	0	2	621,280	1,243	0.142
1983	4	6	621,280	3,728	0.426
1984	0	6	621,280	3,728	0.426
1985	0	6	621,280	3,728	0.426
1986	0	6	621,280	3,728	0.426
1987	0	6	621,280	3,728	0.426
1988	0	6	621,280	3,728	0.426
1989	0	6	621,280	3,728	0.426
1990	0	6	621,280	3,728	0.426
1991	0	6	621,280	3,728	0.426
1992	0	6	621,280	3,728	0.426
1993	0	6	621,280	3,728	0.426
1994	0	6	621,280	3,728	0.426
1995	0	6	621,280	3,728	0.426
1996	0	6	621,280	3,106	0.355
1997	0	6	621,280	2,485	0.284
1998	0	6	621,280	2,485	0.284
1999-2002	0	6	621,280	0	0.000

(Cont'd.)

ENERGY MANAGEMENT PARTNERSHIP PROGRAM**ELECTRICITY SAVINGS FOR THE ENERGY MANAGEMENT PARTNERSHIP PROGRAM**

(Continued)

Year	Participants by Year	Cumulative Participants	kWh Savings per Participant (2)	MWh Savings in Year	Avg. MW Load Reduction in Year
Total Program:					
1980	7	7	—	1,354	0.155
1981	3	10	—	2,219	0.253
1982	10	20	—	3,441	0.393
1983	12	32	—	6,903	0.788
1984	0	32	—	6,903	0.788
1985	0	32	—	6,903	0.788
1986	0	32	—	6,903	0.788
1987	0	32	—	6,903	0.788
1988	0	32	—	6,903	0.788
1989	0	32	—	6,903	0.788
1990	0	32	—	6,903	0.788
1991	0	32	—	6,903	0.788
1992	0	32	—	6,903	0.788
1993	0	32	—	6,903	0.788
1994	0	32	—	6,903	0.788
1995	0	32	—	6,903	0.788
1996	0	32	—	5,549	0.633
1997	0	32	—	4,683	0.535
1998	0	32	—	3,462	0.395
1999-2002	0	32	—	0	0.000
Electricity Savings Since Start of Program:				110,447	MWh

Program Expenditures

The program expenditures from 1980 through 1983 for administration totaled \$234,401. This represents the cost of the utility, and not the total resource cost. There was no outside funding received for this program.

ENERGY MANAGEMENT PARTNERSHIP PROGRAM

PROGRAM EXPENDITURES FOR THE ENERGY MANAGEMENT PARTNERSHIP PROGRAM

Year	Expenditures (3)
1980	\$45,841
1981	22,927
1982	87,367
1983	78,266
1984-2002	0
TOTAL	\$234,401

Notes

1. The lifetime of the conservation measures is based on data presented by Gordon, et al. (Use of Commercial Energy Efficiency Measures Service Life Estimates in Program and Resource Planning, *ACEEE 1988 Summer Study on Energy Efficiency in Buildings*, Vol. 3). Since there is considerable variability in the lifetime of conservation measures for commercial and industrial buildings, the lifetimes for the different measures were amalgamated into one lifetime figure, 16 years.
2. Electricity savings figures are documented in the *Evaluation of the Energy Management Partnership Program* (May 1984). After 1983, the program was discontinued, so the later savings shown represent continuing savings from earlier program participants only.

First year energy savings from new participants completing work in each year were: 1,354 MWh (1980); 865 MWh (1981); 1,222 MWh (1982); and 3,462 MWh (1983).

3. Program expenditures of \$6,548 per customer were calculated for 1980, based on information provided in the *Evaluation of Seattle City Light's Energy Management Consultation Services* (November 1980), and the *Evaluation of the Walk-Through Survey Program for Commercial and Industrial Customers* (June 1983). Only administrative costs are included. Costs borne by the customers have not been estimated. Data are from City Light MIS reports and include labor, overhead, training, and advertising costs. Data for 1981 were not available; thus, an estimate of \$7,642 per customer was used, an average of the 1980 and 1982 expenditures per customer. The 1983 data are from City Light MIS reports for Work Order No. 70534.

ENERGY MANAGEMENT SURVEY PROGRAM

Description

In the Energy Management Survey Program (*EMSP*), Seattle City Light's energy management analysts provided commercial and industrial customers with facility energy surveys, training in energy management practices and monitoring of their energy consumption, and recommendations of conservation measures for increasing the facility's energy efficiency. The program, which replaced the Energy Management Partnership Program and the Walk-Through Survey Program, operated from 1984 through December 1992.

Eligible Population

This program served City Light's 29,520 commercial, 1,995 governmental, and 286 industrial customers. (1)

Lifetime of Conservation Measures Installed

Varies, with an estimated average lifetime of 16 years. (2)

Electricity Savings

The *EMSP* savings for small and medium size commercial customers are 23,200 kilowatt-hours (kWh) annually per participant, or six percent (6%) of the pre-program consumption. The average energy savings for large commercial customers are 122,100 kWh (two percent, 2%, of pre-program consumption). Among industrial participants, the average savings are 73,800 kWh for small and medium size industrial customers, and 621,200 kWh for large industrial customers (11% of pre-program consumption).

Since 1984, *EMSP* has saved a total of 564,032 megawatt-hours (MWh). Energy savings in 2002 from cumulative (1984-1992) participants were 9,691 MWh. The load reduction in 2002 due to this program was 0.964 average megawatts (aMW).

ENERGY MANAGEMENT SURVEY PROGRAM**ELECTRICITY SAVINGS FOR THE ENERGY MANAGEMENT SURVEY PROGRAM (3)**

Year	Partici- pants by Year	Cumulative Participants	kWh Savings per Participant	MWh Savings in Year (4)	Avg. MW Load Reduction in Year
Commercial Customers, Levels 1 & 2:					
1984	293	293	23,200	6,798	0.776
1985	216	509	23,200	11,809	1.348
1986	121	630	23,200	14,616	1.668
1987	33	663	23,200	15,382	1.756
1988	24	687	23,200	15,938	1.819
1989	66	753	23,200	17,470	1.994
1990	25	778	23,200	18,050	2.060
1991	41	819	23,200	19,001	2.169
1992	12	831	23,200	19,279	2.201
1993	0	831	23,200	19,279	2.201
1994	0	831	23,200	19,279	2.201
1995	0	831	23,200	19,279	2.201
1996	0	831	23,200	19,279	2.201
1997	0	831	23,200	19,279	2.201
1998	0	831	23,200	19,279	2.201
1999	0	831	23,200	19,279	2.201
2000	0	831	23,200	12,482	1.425
2001	0	831	23,200	7,470	0.853
2002	0	831	23,200	4,663	0.532
Commercial Customers, Level 3:					
1984	23	23	122,100	2,808	0.321
1985	28	51	122,100	6,227	0.711
1986	11	62	122,100	7,570	0.864
1987	10	72	122,100	8,791	1.004
1988	4	76	122,100	9,280	1.059
1989	0	76	122,100	9,280	1.059
1990	9	85	122,100	10,379	1.185
1991	7	92	122,100	11,233	1.282
1992	1	93	122,100	11,355	1.296
1993	0	93	122,100	11,355	1.296
1994	0	93	122,100	11,355	1.296
1995	0	93	122,100	11,355	1.296
1996	0	93	122,100	11,355	1.296
1997	0	93	122,100	11,355	1.296
1998	0	93	122,100	11,355	1.296
1999	0	93	122,100	11,355	1.296
2000	0	93	122,100	8,547	0.976
2001	0	93	122,100	5,128	0.585
2002	0	93	122,100	3,785	0.432

(Cont'd.)

ENERGY MANAGEMENT SURVEY PROGRAM**ELECTRICITY SAVINGS FOR THE ENERGY MANAGEMENT SURVEY PROGRAM**

(Continued)

Year	Partici- pants by Year	Cumulative Participants	kWh Savings per Participant	MWh Savings in Year (4)	Avg. MW Load Reduction in Year
Industrial Customers, Levels 1 & 2:					
1984	1	1	73,800	74	0.008
1985	3	4	73,800	295	0.034
1986	1	5	73,800	369	0.042
1987	0	5	73,800	369	0.042
1988	0	5	73,800	369	0.0421
1989	0	5	73,800	369	0.042
1990	0	5	73,800	369	0.042
1991	0	5	73,800	369	0.042
1992	0	5	73,800	369	0.042
1993	0	5	73,800	369	0.042
1994	0	5	73,800	369	0.042
1995	0	5	73,800	369	0.042
1996	0	5	73,800	369	0.042
1997	0	5	73,800	369	0.042
1998	0	5	73,800	369	0.042
1999	0	5	73,800	369	0.042
2000	0	5	73,800	295	0.034
2001	0	5	73,800	74	0.008
2002	0	5	73,800	0	0.000
Industrial Customers, Level 3:					
1984	5	5	621,200	3,106	0.355
1985	1	6	621,200	3,727	0.425
1986	1	7	621,200	4,348	0.496
1987	1	8	621,200	4,970	0.567
1988	0	8	621,200	4,970	0.567
1989	0	8	621,200	4,970	0.567
1990	0	8	621,200	4,970	0.567
1991	0	8	621,200	4,970	0.567
1992	1	9	621,200	5,591	0.638
1993	0	9	621,200	5,591	0.638
1994	0	9	621,200	5,591	0.638
1995	0	9	621,200	5,591	0.638
1996	0	9	621,200	5,591	0.638
1997	0	9	621,200	5,591	0.638
1998	0	9	621,200	5,591	0.638
1999	0	9	621,200	5,591	0.638
2000	0	9	621,200	2,485	0.284
2001	0	9	621,200	1,864	0.213
2002	0	9	621,200	1,242	0.142
					(Cont'd.)

ENERGY MANAGEMENT SURVEY PROGRAM

ELECTRICITY SAVINGS FOR THE ENERGY MANAGEMENT SURVEY PROGRAM

(Continued)

Year	Partici- pants by Year	Cumulative Participants	kWh Savings per Participant	MWh Savings in Year (4)	Avg. MW Load Reduction in Year
Total Program, Levels 1, 2 & 3:					
1984	322	322	—	12,786	1.460
1985	248	570	—	22,058	2.518
1986	134	704	—	26,904	3.070
1987	44	748	—	29,511	3.369
1988	28	776	—	30,557	3.487
1989	66	842	—	32,088	3.663
1990	34	876	—	33,767	3.855
1991	48	924	—	35,573	4.061
1992	14	938	—	36,594	4.177
1993	0	938	—	36,594	4.177
1994	0	938	—	36,594	4.177
1995	0	938	—	36,594	4.177
1996	0	938	—	36,594	4.177
1997	0	938	—	36,594	4.177
1998	0	938	—	36,594	4.177
1999	0	938	—	36,594	4.177
2000	0	938	—	23,809	2.718
2001	0	938	—	14,536	1.438
2002	0	938	—	9,691	0.964
Electricity Savings Since Start of Program:				564,032	MWh

Program Expenditures

Program expenditures from 1984 through 1992 totaled \$676,552. Expenditures in 1992 were \$7,219. This represents the cost to the utility, and not the total resource cost. There is no outside funding for this program. (5)

ENERGY MANAGEMENT SURVEY PROGRAM

PROGRAM EXPENDITURES FOR THE ENERGY MANAGEMENT SURVEY PROGRAM

Year	Expenditures (6)
1984	\$235,333
1985	262,622
1986	39,859
1987	82,082
1988	28,100
1989	28,917
1990	45,499
1991	27,460
1992	7,219
1993-2002	0
Total	\$757,091

Notes

1. The eligible population figures are from the *Seattle City Light Fingertip Facts* (December 1993).
2. The 16 year lifetime for conservation measures is based on surveys of conservation measures taken by participants in the Energy Management Survey Program (e.g., *Operational Evaluation of the Energy Management Survey Program for Commercial and Industrial Customers*, 1985) and the lifetimes reported by Gordon, McRae, and Rufo (Use of Commercial Energy Efficiency Measure Service Life Estimates in Program and Resource Planning, *Proceedings of the 1988 ACEEE Summer Study on Energy Efficiency in Buildings*, Volume 3, pp. 3.84-3.96).
3. The type of service that is provided to a customer is determined primarily by the customer's annual electricity consumption. The annual electricity consumption for the three service levels are: level 1—6,000 to 48,000 kilowatt-hours (may be as high as 150,000 kilowatt-hours at the discretion of the energy management analyst); level 2—48,000 to 1,000,000 kilowatt-hours; and level 3—above 1,000,000 kilowatt-hours.
4. Energy savings information was derived from the following evaluation reports: *Evaluation of the Walk-through Survey Program for Commercial and Industrial Customers* (June 1983); and *Evaluation of the Energy Management Partnership Program* (May 1984).

The MWh energy savings reported by year reflect savings for the current year participants plus savings in that year from all prior participants.

First year energy savings from program participants completing work in each year were: 12,786 MWh (1984); 9,273 MWh (1985); 4,845 MWh (1986); 2,608 MWh (1987); 1,045 MWh (1988); 1,531 MWh (1989); 1,679 MWh (1990); 1,806 MWh (1991); and 1,022 MWh (1992).

5. Expenditures in 1993 for the program were \$6,764. These expenses have been allocated to the administrative costs for the Energy Smart Design Program.

ENERGY MANAGEMENT SURVEY PROGRAM

6. The source of *EMSP* administration expenditures for 1984-1990 is City Light MIS reports for Work Order No. 70503. The 1986 figure also includes \$11,640 in funds that were incorrectly charged to the discontinued Energy Management Partnership Program (Work Order No. 70534).

For 1987, the administrative costs include \$80,539 that were charged to the Commercial Incentives Pilot program (Work Order No. 70596). For 1991 and 1992, the administrative costs were obtained from Work Order No. 70503 in the year-end Seattle Financial Management System's Work Order Detail Report (1991) and Monthly Master Work Order Report (1992).

GENERAL SERVICE EFFICIENCY STANDARDS

Description

Commercial customers requesting new or enlarged electric service are required to implement certain conservation measures. Mandatory measures may involve lighting or water heating conservation measures, or insulation of electric heating ducts. In addition, customers who add electric resistance space heat must have an electric energy analysis. The General Service Efficiency Standards (*GSES*, originally called the Commercial Efficiency Standards) were adopted in June 1982.

Some customers requesting a new or enlarged electric service are exempt from the *GSES*. For example, buildings constructed since the implementation of the Seattle Energy Code in February 1980 are not required to meet the standards. Additional information on buildings exempted from the standards can be found in Section 5.2 of Seattle City Light's *Requirements for Electric Service Connection*.

Eligible Population

The standard applies to current commercial customers requesting new or enlarged electric service.

Lifetime of Conservation Measures Installed

10 years for measures installed in 1983 through 1985; 18 years for measures installed in 1986 through 1995.

Electricity Savings

Since 1983 the *GSES* has saved a total of 43,189 megawatt-hours (MWh). Energy savings in 2002 from cumulative (1983-1995) participants were 2,879 MWh. The load reduction in 2002 due to this program was 0.329 average megawatts (aMW).

GENERAL SERVICE EFFICIENCY STANDARDS**ELECTRICITY SAVINGS FOR THE GENERAL SERVICE EFFICIENCY STANDARDS**

Year	Participants by Year (1)	Cumulative Participants	kWh Savings per Participant (2)	MWh Cumulative Savings in Year	Avg. MW Load Reduction in Year
1983	59	59	689	41	0.005
1984	120	179	689	123	0.014
1985	97	276	689	190	0.022
1986	111	387	5,923	848	0.097
1987	104	491	5,923	1,464	0.167
1988	54	545	5,923	1,783	0.204
1989	27	572	5,923	1,943	0.222
1990	61	633	5,923	2,305	0.263
1991	78	711	5,923	2,767	0.316
1992	14	725	5,923	2,850	0.325
1993	21	746	5,923	2,933	0.335
1994	10	756	5,923	2,910	0.332
1995	6	762	5,923	2,879	0.329
1996	0	762	5,923	2,879	0.329
1997	0	762	5,923	2,879	0.329
1998	0	762	5,923	2,879	0.329
1999	0	762	5,923	2,879	0.329
2000	0	762	5,923	2,879	0.329
2001	0	762	5,923	2,879	0.329
2002	0	762	5,923	2,879	0.329
Electricity Savings Since Start of Program:				43,189	MWh

Program Expenditures

Annual expenditures during 1995 were \$9,609. Cumulative program expenditures have totaled \$192,191 since 1983, the first full year of the *GSES*. This represents the cost to the utility, and not the total resource cost. No outside funding is received for this program.

GENERAL SERVICE EFFICIENCY STANDARDS

PROGRAM EXPENDITURES FOR THE GENERAL SERVICE EFFICIENCY STANDARDS

Year	Expenditures (3)
1983	\$12,670
1984	18,468
1985	19,424
1986	30,737
1987	16,042
1988	14,403
1989	11,854
1990	11,941
1991	12,722
1992	14,069
1993	11,901
1994	8,351
1995	9,609
1996-2002	0
TOTAL	\$192,191

Notes

1. The number of customers complying with the *GSES* was obtained from City Light staff in the Customer Engineering Section, North and South Electrical Services Centers. Staff completed the "Prescriptive Measures" form for each customer who complies with the 5.2 standard.
2. The energy savings (689 kWh) and lifetime (10 years) of conservation measures for participants during 1983-1985 are based on the *Evaluation of the Commercial Efficiency Standards* (1985). This level of savings is carried forward in the table for the lifetime of the measures installed during 1983-1985. The energy savings (5,923 kWh) and the lifetime (18 years) of conservation measures for 1986-1993 participants are based on the *Evaluation Update on the General Efficiency Standards* (1988). This level of savings is likewise carried forward in the table for the lifetime of the measures installed during 1986-1994.

The energy savings found in the second evaluation are substantially higher than the savings found in the first evaluation. The higher savings found in the second evaluation are due to indoor lighting actions taken in response to the *GSES* from April 1984 through May 1986. One possible reason for the greater savings with these lighting actions included is that greater remodeling took place during the period covered by the second evaluation. See the *Evaluation Update on the General Service Efficiency Standards* (1988) for additional discussion of the energy savings found by the two evaluations.

The MWh energy savings reported by year reflect savings for the current year participants plus savings in that year from all prior participants.

GENERAL SERVICE EFFICIENCY STANDARDS

First year energy savings from new participants completing work in each year were: 41 MWh (1983); 83 MWh (1984); 67 MWh (1985); 657 MWh (1986); 616 MWh (1987); 320 MWh (1988); 160 MWh (1989); 361 MWh (1990); 462 MWh (1991); 83 MWh (1992); 124 MWh (1993); 59 MWh (1994); and 36 MWh (1995).

3. The source of program administration and implementation expenditures for 1985 through 1990 is Seattle City Light financial reports for Work Order Nos. 70368-01 and 70368-02.

For 1991 through 1995, cost data were taken from Work Order No. 70368 in the Seattle Financial Management System year-end Work Order Detail Report (1991) and Monthly Master Work Order Report (1992 through 1995).

Administrative costs for 1993 and 1994 do not include a new A&G overhead charge (begun in April 1993) for utility administrative and general expenses. This charge distributes departmental administrative and general expenses, including nonprogrammatic labor and expenses, to individual conservation programs in proportion to programmatic labor hours.

INDUSTRIAL RESEARCH AND DEMONSTRATION PROJECT

Description

The Industrial Research and Demonstration project (*IRDP*) was proposed by Seattle City Light in early 1986 to:

- Develop overall goals for industrial conservation;
- Construct industrial databases;
- Estimate industrial conservation potential;
- Define industrial program targets; and,
- Establish monitoring, assessment, and evaluation standards for future industrial programs. (1)

The central purpose of the *IRDP* was to test the energy savings and cost-effectiveness for a set of 15 pilot industrial retrofit projects. Consequently, the *IRDP* was not intended to become the ongoing industrial conservation program at Seattle City Light. For a description of City Light's current industrial conservation program, see the *Energy Savings Plan Program*, in SECTION III: ACTIVE COMMERCIAL–INDUSTRIAL PROGRAMS.

Under the terms of the *IRDP*, City Light provided up to 70% of the cost of energy efficient measures for 15 industrial customers. These measures were installed between 1988 and 1992 and included high-efficiency furnace, motor, HVAC (heating, ventilating and air conditioning), air compressor, lighting, welding, and refrigeration measures. Although the final *IRDP* project was completed in 1992, payments to participants and administrative costs continued in 1993.

Eligible Population

Fifteen industrial customers were chosen from the population of 286 industrial customers in the City Light service area. (2)

INDUSTRIAL RESEARCH AND DEMONSTRATION PROJECT

Lifetime of Conservation Measures Installed

Varies between 12 and 20 years depending on measure type, with a weighted average lifetime of 15 years.

Electricity Savings

Since 1988 the Industrial Research and Demonstration Project has saved a total of 40,142 megawatt-hours (MWh). Energy savings in 2002 from cumulative (1988-1992) participants were 3,196 MWh. The load reduction in 2002 due to this program was 0.365 average megawatts (aMW).

**ELECTRICITY SAVINGS FOR THE
INDUSTRIAL RESEARCH AND DEMONSTRATION PROJECT (3)**

Year	Completed Projects by Year	Cumulative Number of Projects	kWh Savings per Project	MWh Savings in Year	Avg. MW Load Reduction in Year
1988	2	2	10,000	20	0.002
1989	5	7	240,516	1,223	0.140
1990	3	10	161,067	1,706	0.195
1991	2	12	165,500	2,037	0.233
1992	3	15	386,483	3,196	0.365
1993	0	15	0	3,196	0.365
1994	0	15	0	3,196	0.365
1995	0	15	0	3,196	0.365
1996	0	15	0	3,196	0.365
1997	0	15	0	3,196	0.365
1998	0	15	0	3,196	0.365
1999	0	15	0	3,196	0.365
2000	0	15	0	3,196	0.365
2001	0	15	0	3,196	0.365
2002	0	15	0	3,196	0.365
Electricity Savings Since Start of Program:				40,142	MWh

INDUSTRIAL RESEARCH AND DEMONSTRATION PROJECT

Program Expenditures

Between 1988 and 1993, program expenditures totaled \$689,259. The total Seattle City Light project expenditures for *IRDP* in 1993 were \$114,375. These expenditures represent the cost to the utility, and not the total resource cost. No outside funding was received for this project.

**PROGRAM EXPENDITURES FOR THE
INDUSTRIAL RESEARCH AND DEMONSTRATION PROJECT (4)**

Year	Administration	Payment Made to Participants	Total
1988	\$35,461	\$9,994	\$45,455
1989	35,461	151,112	186,573
1990	36,154	137,479	173,633
1991	22,405	61,040	83,445
1992	56,640	29,138	85,778
1993	55,566	58,809	114,375
1994-2002	0	0	0
TOTAL	\$241,687	\$447,572	\$689,259

Notes

1. A report assessed the accomplishment of these program goals, entitled *IRD: Industrial Research and Demonstration Project*, Seattle City Light, Energy Management Services Division, Program Development Section (August 1993).
2. The eligible population figure is from the *Seattle City Light Fingertip Facts* (1993).
3. The source of energy savings is Table 3 (p.27) from the report, *IRD: Industrial Research and Demonstration Project* (August 1993).

One of the projects completed in 1992 (Associated Grocers) was funded from two sources, \$87,415 (74%) coming from the BPA direct-funded Energy Savings Plan, and \$31,000 from the *IRDP* (26%). The energy savings shown in this table reflect the portion of total verified savings pro-rated to *IRDP* funding (1,881,088 kWh per year * 0.26179). The remainder of energy savings (1,388,638 kWh) are included under the *E\$P* program entry.

First year energy savings from new participants completing work in each year were: 20 MWh (1988); 1,203 MWh (1989); 483 MWh (1990); 331 MWh (1991); and 1,159 MWh (1992).

INDUSTRIAL RESEARCH AND DEMONSTRATION PROJECT

4. Program administrative expenditures were compiled from Management Information System (MIS) reports in 1988-1990, and from Seattle Financial Management System (SFMS) reports in 1991-1993, for Work Order Nos. 70524-01 and 70541-01. Program participant payment data for 1983-1993 were compiled from MIS and SFMS reports for Work Order No. 70541-01.

Administrative costs for 1993 do not include a new A&G overhead charge (begun in April 1993) for utility administrative and general expenses. This charge distributes departmental administrative and general expenses, including nonprogrammatic labor and expenses, to individual conservation programs in proportion to programmatic labor hours.

LIGHTING INCENTIVE PROGRAMS

Description

Seattle City Light operated a pilot lighting incentive program from December 15, 1980 through March 15, 1981. The program sponsored by the Bonneville Power Administration operated from December 29, 1981 to October 1, 1983. Both programs offered rebates to commercial customers for replacing conventional fluorescent lamps with energy-efficient fluorescent lamps.

Eligible Population

It was expected that 734,200 lamps would be replaced under the Bonneville Power Administration's Lighting Incentive Program.

Lifetime of Conservation Measures Installed: 5 years

Electricity Savings

The average participant in the Lighting Incentive Programs saves about 34,110 kilowatt-hours (kWh) per year. The savings for each energy-efficient lamp were five watts, as the rated wattage was 35 watts for the energy-efficient lamps and 40 watts for the standard fluorescent lamps.

Between 1981 and 1987, the Lighting Incentive Programs saved a total of 61,057 megawatt-hours (MWh). However, since the lifetime of these measures has expired, this program did not deliver any savings in 2002.

Program Expenditures

Seattle City Light and the Bonneville Power Administration spent \$439,264 (\$387,664 plus \$51,600) on the Lighting Incentive Program from 1981 through 1983.

LIGHTING INCENTIVE PROGRAMS**ELECTRICITY SAVINGS FOR LIGHTING INCENTIVE PROGRAMS**

Year	Buildings by Year	Cumulative Buildings	kWh Savings per Building	MWh Savings in Year (1)	Avg. MW Load Reduction in Year
1981	35	35	34,110	1,194	0.136
1982	107	142	34,110	4,844	0.553
1983	216	358	34,110	12,211	1.394
1984	0	358	34,110	12,211	1.394
1985	0	358	34,110	12,211	1.394
1986	0	358	34,110	11,018	1.258
1987	0	358	34,110	7,368	0.841
1988-2002	0	358	34,110	0	0.000
Electricity Savings Since Start of Programs:				61,057	MWh

**PROGRAM EXPENDITURES FOR THE PILOT
SEATTLE CITY LIGHT LIGHTING INCENTIVE PROGRAM**

Year	Expenditures (2)
1981	\$51,600
1982-2002	0
TOTAL	\$51,600

PROGRAM EXPENDITURES FOR THE BPA LIGHTING INCENTIVE PROGRAM

Year	Expenditures (3)
1981	\$44,841
1982	132,854
1983	209,969
1984-2002	0
TOTAL	\$387,664

LIGHTING INCENTIVE PROGRAMS

BPA FUNDING FOR THE BPA LIGHTING INCENTIVE PROGRAM

Year	BPA Funding ⁽⁴⁾
1981	\$40,073
1982	87,253
1983	219,119
1984-2002	0
TOTAL	\$346,445

Notes

- Electricity savings figures are from the *Evaluation of Seattle City Light's Lighting Incentive Program* (May 1981). After 1983 the program was discontinued, so the later savings shown represent continuing savings from earlier program participants only. Savings drop to zero in 1988 because the measure lifetime has been exceeded.

First year energy savings from new participants completing work in each year were: 1,194 MWh (1981); 3,650 MWh (1982); and 7,367 MWh (1983).
- Expenditures for the pilot program are documented in the *Evaluation of Seattle City Light's Incentive Program* (May 1981).
- Expenditures are from the Conservation Data Base, Energy Management Services Division. Reimbursements from the BPA are not included.
- The BPA funding figures are from the BPA Short-term Contract Final Report.

LIGHTING SURVEY PROGRAM

Description

Seattle City Light provided free lighting surveys to commercial and industrial customers to improve the efficiency of lighting systems. Detailed lists of conservation measures to improve lighting systems, along with energy savings and cost information, were provided to customers. This program was in effect from 1979 to December 1983, at which time it was amalgamated into the Energy Management Survey Program.

Eligible Population

This program served City Light's commercial and industrial customers.

Lifetime of Conservation Measures Installed: 5 years

Electricity Savings

The average participant in the Lighting Survey Program saved about 50,830 kilowatt-hours (kWh) per year.

Between 1979 and 1987, the Lighting Survey Program saved a total of 28,210 megawatt-hours. However, since the lifetime of these measures has expired, this program did not deliver any savings in 2002.

Program Expenditures

The program expenditures from 1979 through 1983 totaled \$29,685. This represents the cost to the utility, and not the total resource cost. There was no outside funding received for this program.

LIGHTING SURVEY PROGRAM**ELECTRICITY SAVINGS FOR THE LIGHTING SURVEY PROGRAM**

Year	Participants by Year	Cumulative Participants	kWh Savings per Participant (1)	MWh Savings in Year (2)	Avg. MW Load Reduction in Year
1979	51	51	50,830	2,592	0.296
1980	7	58	50,830	2,948	0.337
1981	41	99	50,830	5,032	0.574
1982	4	103	50,830	5,235	0.598
1983	8	111	50,830	5,642	0.644
1984	0	111	50,830	3,050	0.348
1985	0	111	50,830	2,694	0.308
1986	0	111	50,830	610	0.070
1987	0	111	50,830	407	0.046
1988-2002	0	111	50,830	0	0.000
Electricity Savings Since Start of Program:				28,210	MWh

PROGRAM EXPENDITURES FOR THE LIGHTING SURVEY PROGRAM

Year	Expenditures (3)
1979	\$8,292
1980	1,138
1981	6,666
1982	650
1983	12,939
1984-2002	0
TOTAL	\$29,685

Notes

1. Electricity savings figures are documented in *Energy Savings in the Commercial-Industrial Energy Management Services Program* (October 1981).
2. After 1983 the program was discontinued, so the later savings represent continuing savings from earlier participants only. Savings drop to zero in 1988 because the measure lifetime has been exceeded. First year energy savings from new participants completing work in each year were: 2,592 MWh (1979); 356 MWh (1980); 2,084 MWh (1981); 203 MWh (1982); and 407 MWh (1983).
3. Program costs of approximately \$162 per customer were calculated for 1979 through 1982, based on information provided in the *Evaluation of Seattle City Light's Energy Management Consultation Services* (November 1980). The 1983 data are from City Light MIS reports for Work Order No. 70509.

STREET AND AREA LIGHTING PROGRAM

Description

The Street and Area Lighting Program provided replacement of mercury vapor streetlights with energy-efficient high-pressure sodium luminaires throughout the city. In addition, certain fluorescent fixtures and all mercury and incandescent floodlights were being replaced.

This program began operation in 1982. The Bonneville Power Administration (BPA) sponsored the program from September 1982 to September 1983, and from October 1985 through 1986. Since 1987, Seattle City Light continued the conversion program on its own.

The Street and Area Lighting Program wound down between 1990 and 1992, and was discontinued by the beginning of 1993. The bulk of the conversions between 1990 and 1992 were changes from 1000 watt mercury vapor to 400 watt high-pressure sodium luminaires which produced a relatively high average savings per replacement figure. In prior years, average watt reductions were not as large.

Eligible Population

Approximately 70,000 lamps were originally expected to be replaced under this program. However, at the time the program began, a system cataloging types of lights and fixtures and locations of poles was not in place. This system was instituted in 1989. It is currently estimated that 85,500 streetlights exist in the City Light service area. Of these lights, 70,600 are general-fund while the remaining 14,900 are rentals, mainly outside the city.

By the end of 1992, 60,984 streetlights had been converted to high-pressure sodium. Of the remaining lights, some were originally installed as high-pressure sodium lights and thus did not require conversion.

Lifetime of Conservation Measures Installed: 20 years

STREET AND AREA LIGHTING PROGRAM

Electricity Savings

Since 1982 the Street and Area Lighting Program has saved a total of 474,711 megawatt-hours (MWh). Energy savings in 2002 from cumulative (1982-1992) participants were 24,567 MWh. The load reduction in 2002 due to this program was 2.804 average megawatts (aMW).

ELECTRICITY SAVINGS FOR THE STREET AND AREA LIGHTING PROGRAM

Year	Lamps Replaced by Year (1)	Cumulative Replaced Lamps	kWh Avg. Savings per Replacement (2)	MWh Savings in Year	Avg. MW Load Reduction in Year
1982	4,109	4,109	434	1,783	0.204
1983	16,452	20,561	446	9,121	1.041
1984	4,598	25,159	545	11,627	1.327
1985	9,813	34,972	478	16,317	1.863
1986	13,066	48,038	394	21,465	2.450
1987	6,429	54,467	330	23,587	2.693
1988	3,279	57,746	285	24,522	2.799
1989	2,884	60,630	436	25,779	2.943
1990	235	60,865	1,579	26,150	2.985
1991	85	60,950	1,680	26,293	3.001
1992	34	60,984	1,680	26,350	3.008
1993	0	60,984	1,680	26,350	3.008
1994	0	60,984	1,680	26,350	3.008
1995	0	60,984	1,680	26,350	3.008
1996	0	60,984	1,680	26,350	3.008
1997	0	60,984	1,680	26,350	3.008
1998	0	60,984	1,680	26,350	3.008
1999	0	60,984	1,680	26,350	3.008
2000	0	60,984	1,680	26,350	3.008
2001	0	60,984	1,680	26,350	3.008
2002	0	60,984	1,680	24,567	2.804
Electricity Savings Since Start of Programs:				474,711	MWh

Program Expenditures

Expenditures for street and area lighting conversions totaled \$10,472,546 over the eleven years from 1982 through 1992. In 1992, expenditures were \$167,176. Some BPA funding for the program was available in 1982, 1983, 1985, and 1986, totaling \$3,464,726. Since 1986, City Light covered all program costs.

STREET AND AREA LIGHTING PROGRAM**PROGRAM EXPENDITURES FOR THE STREET AND AREA LIGHTING PROGRAM (3)**

Year	Expenditures
1982	\$682,052
1983	2,380,145
1984	1,158,046
1985	1,329,245
1986	1,221,759
1987	995,767
1988	937,698
1989	928,208
1990	372,502
1991	299,948
1992	167,176
1993-2002	0
Total	\$10,472,546

BPA FUNDING FOR THE STREET AND AREA LIGHTING PROGRAM (4)

Year	BPA Funding
1982	\$1,109,813
1983	2,219,626
1984	0
1985	80,663
1986	54,624
1987-2002	0
Total	\$3,464,726

Notes

1. Data regarding the number and type of street light replacements were obtained from the "Streetlight Conversion Monthly Reports" for 1982 through 1985. Data for 1986 through 1992 were received from City Light's Streetlight Maintenance Unit.
2. The energy savings calculations were based on 4,200 hours of burning time per year. Ballast electricity use for both the installed and replaced lamps was included in the energy savings calculations. Data regarding ballasts were obtained from the *General Electric Ballast Catalogue*. Fixture watt information was obtained from the *CIPP BPA Audit Workbook*. Separate savings calculations were made for each type of lamp replacement and aggregated for this table.

STREET AND AREA LIGHTING PROGRAM

First year energy savings from new participants completing work in each year were: 1,783 MWh (1982); 7,338 MWh (1983); 2,506 MWh (1984); 4,691 MWh (1985); 5,148 MWh (1986); 2,122 MWh (1987); 935 MWh (1988); 1,257 MWh (1989); 371 MWh (1990); 143 MWh (1991); and 57 MWh (1992).

3. Program expenditures for 1982 through 1990 are compiled from City Light Cost Ledger reports for Work Order Nos. 30655-01, 30655-06, 30655-16, and 30655-26. For 1992, cost data were taken for the same work order numbers from Seattle Financial Management System year-end reports.
4. The BPA funding figures for 1982-1983 were obtained from the BPA Short-term Contract Final Report. The 1985-1987 reimbursements were obtained from the BPA Long-Term Contract monthly invoices.

WALK-THROUGH SURVEY PROGRAM

Description

Seattle City Light's energy management analysts provided technical assistance to commercial and industrial customers by conducting surveys of business facilities, and providing written recommendations for tuning, maintenance, operations, and retrofit conservation measures to reduce energy consumption in the buildings. On January 1, 1984, the Walk-through Survey Program was amalgamated into the Energy Management Survey Program.

Eligible Population

This program served City Light's commercial and industrial customers.

Lifetime of Conservation Measures Installed

Varies, with an estimated average lifetime of 16 years. The conservation measures were installed by customers following City Light's recommendations. (1)

Electricity Savings

The average savings per participant were 23,180 kilowatt-hours (6% of the pre-program consumption) for commercial program participants and 73,830 kilowatt-hours for industrial customers.

Between 1980 and 1998, the Walk-through Survey Program has saved a total of 185,168 megawatt-hours (MWh). However, since the lifetime of these measures has expired, this program did not deliver any savings in 2002.

WALK-THROUGH SURVEY PROGRAM

ELECTRICITY SAVINGS FOR THE WALK-THROUGH SURVEY PROGRAM

Year	Participants by Year	Cumulative Participants	kWh Savings per Participant (2)	MWh Savings in Year (3)	Avg. MW Load Reduction in Year
Commercial Customers:					
1980	30	30	23,180	695	0.079
1981	87	117	23,180	2,712	0.310
1982	135	252	23,180	5,841	0.667
1983	174	426	23,180	9,875	1.127
1984	0	426	23,180	9,875	1.127
1985	0	426	23,180	9,875	1.127
1986	0	426	23,180	9,875	1.127
1987	0	426	23,180	9,875	1.127
1988	0	426	23,180	9,875	1.127
1989	0	426	23,180	9,875	1.127
1990	0	426	23,180	9,875	1.127
1991	0	426	23,180	9,875	1.127
1992	0	426	23,180	9,875	1.127
1993	0	426	23,180	9,875	1.127
1994	0	426	23,180	9,875	1.127
1995	0	426	23,180	9,875	1.127
1996	0	426	23,180	9,179	1.048
1997	0	426	23,180	7,163	0.818
1998	0	426	23,180	4,033	0.460
1999-2002	0	426	23,180	0	0.000
Industrial Customers:					
1980	4	4	73,830	295	0.034
1981	11	15	73,830	1,107	0.126
1982	5	20	73,830	1,477	0.169
1983	3	23	73,830	1,698	0.194
1984	0	23	73,830	1,698	0.194
1985	0	23	73,830	1,698	0.194
1986	0	23	73,830	1,698	0.194
1987	0	23	73,830	1,698	0.194
1988	0	23	73,830	1,698	0.194
1989	0	23	73,830	1,698	0.194
1990	0	23	73,830	1,698	0.194
1991	0	23	73,830	1,698	0.194
1992	0	23	73,830	1,698	0.194
1993	0	23	73,830	1,698	0.194
1994	0	23	73,830	1,698	0.194
1995	0	23	73,830	1,698	0.194
1996	0	23	73,830	1,403	0.160
1997	0	23	73,830	591	0.067
1998	0	23	73,830	221	0.025
1999-2002	0	23	73,830	0	0.000

(Cont'd.)

WALK-THROUGH SURVEY PROGRAM**ELECTRICITY SAVINGS FOR THE WALK-THROUGH SURVEY PROGRAM**

(Continued)

Year	Participants by Year	Cumulative Participants	kWh Savings per Participant (2)	MWh Savings in Year (3)	Avg. MW Load Reduction in Year
Total Program:					
1980	34	34	—	991	0.113
1981	98	132	—	3,820	0.436
1982	140	272	—	7,318	0.835
1983	177	449	—	11,573	1.321
1984	0	449	—	11,573	1.321
1985	0	449	—	11,573	1.321
1986	0	449	—	11,573	1.321
1987	0	449	—	11,573	1.321
1988	0	449	—	11,573	1.321
1989	0	449	—	11,573	1.321
1990	0	449	—	11,573	1.321
1991	0	449	—	11,573	1.321
1992	0	449	—	11,573	1.321
1993	0	449	—	11,573	1.321
1994	0	449	—	11,573	1.321
1995	0	449	—	11,573	1.321
1996	0	449	—	10,582	1.208
1997	0	449	—	7,753	0.885
1998	0	449	—	4,255	0.486
1999-2002	0	449	—	0	0.000
Electricity Savings Since Start of Program:				185,168	MWh

Program Expenditures

The program expenditures from 1980 through 1983 totaled \$459,055. This represents the cost to the utility, and not the total resource cost. There was no outside funding received for this program.

WALK-THROUGH SURVEY PROGRAM

PROGRAM EXPENDITURES FOR THE WALK-THROUGH SURVEY PROGRAM

Year	Expenditures (4)
1980	\$40,222
1981	115,934
1982	165,620
1983	137,279
1984-2002	0
TOTAL	\$459,055

Notes

- As discussed by Gordon, et al. (Use of Commercial Energy Efficiency Measure Service Life Estimates in Program and Resource Planning, *ACEEE 1988 Summer Study on Energy Efficiency in Buildings*, Volume 3), there is considerable variability in the lifetime of conservation measures installed in commercial and industrial facilities. For example, Gordon, et al. found that the lifetime for efficient lamps is usually from three to six years, whereas the lifetime for heating, ventilating, and air conditioning measures was much longer, typically 10 to 20 years. The conservation measures lifetime presented in this report, 16 years, is an amalgamation of the lifetime for the different measures.
- Electricity savings figures are documented in the *Evaluation of the Walk-Through Survey Program for Commercial and Industrial Customers* (June 1983).
- After 1983 the program was discontinued, so the later savings shown represent continuing savings from earlier program participants only.

First year energy savings from new participants completing work in each year were: 991 MWh (1980); 2,829 MWh (1981); 3,498 MWh (1982); and 4,255 MWh (1983).
- Expenditures for 1980 through 1982 (\$1,183 per customer) are documented in the *Evaluation of the Walk-Through Survey Program for Commercial and Industrial Customers* (June 1983). The 1983 data are from City Light MIS reports for Work Order No. 70503.